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BOOK REVIEWS

Photonics Elements and Devices

by V V Rampal

A H Wheeler : Allahabad, India, 1992
xii + 330 pages, illustrated ; price : Rs 250.00 (bound) , ISBN 81-85614-51-2

In recent years photonics has emerged as an important technology related to the generation and application of coherent radiation in the optical band The subject encompasses diverse area like non-linear optics, optical fibres, integrated optics, harmonic generation, optical switches and display devices. This book contains a very comprehensive chapters on newly developed subject photonics, dealing with fundamental processes in photonics and related devices. It's object is to provide in an organised form, a collation of most of the available knowledge in the field and to discuss the applications and future prospects. The author has brought the chapters together in a well written, well planned and presentable manner and has left few stones unturned. Whilst some of the information contained in the book is scattered throughout the literature, this book provides an overview and novel forum on the subject and in this respect, it is a valuable addition.

The monograph is made up of six chapters beginning with the idea of photonics in relation to optical and electrical processes. The second chapter covers various optical processes in photonic systems. The comparison of electronic and optical processes helps one to appreciate that there exists a number of techniques for performing the desired objectives in a better way in the optical band. The advent of high power lasers has opened new vistas of whole range of non-linear phenomena in optics. The third chapter deals with the theoretical foundations for non-linear optics related to frequency conversion, self focussing bistability, phase conjugation, dynamic holography and optical chaos. In fibre optic communication the propagation of electromagnetic radiation as a guided wave in dielectric media forms the basis of it. In chapter 4, the basic principles of fibre and integrated optics, fabrication of optical fibres, radiation induced damage, coupling mechanisms etc. have been discussed in an elegant way. The content of Chapter 5 is arranged in such a way that one gets information about various types of lasers and their applications in integrated optic circuit by just flipping through it. The first part of this chapter deals with the principles of laser resonator, optical amplification, modes of oscillation and excitation mechanism of different types of lasers. In the next part, different types of detectors mainly thermal and photon detectors have been discussed in detail. The final part is aimed at various aspects of detector noise, optical imaging, CCD as image sensor, different types of spatial light modulators and optical processing. The sixth chapter describes the varied applications of lasers including industrial, medical, defence, communications and information processing.

The presentation is in general good, despite being engrossed with printer's devil in some places. Although this book is on specialised topic, it nevertheless represents developments in an important multidisciplinary area involving futuristic applications.

In general, the book is a valuable and useful overview of the subjects it deals with recommended to scientists, technologists and students alike working in this specialised field and specially to them who are newly exposed to this field.

S CHAKRAVORTI
Department of Spectroscopy,
Indian Association for the Cultivation of Science,
Jadavpur, Calcutta-700 032